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Strengthening quality technology infrastructure is a top priority

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Strengthening quality technology infrastructure is a top priority

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Abstract. Measurement, standards, certification and accreditation and inspection and testing are the four major aspects of the internationally recognized national quality foundation. The national quality foundation is not only the technical support of the government to give play to the quality of quality supervision, but also the core of the national technology trade. It is also an important tool and technical language to promote the cooperation, exchanges and economic and trade exchanges between China and other countries in the world. At present, our country is in the crucial stage of development transformation. We must pay attention to the construction of quality technology and building China into a world industrial power.

1. Connotation of quality technology foundation

Quality technical foundation refers to a country in order to boost the construction quality and set up and implement the standardization, metrology testing, certification and accreditation, inspecting and testing the quality of the work required collectively mechanism, system and regulations system framework, which includes both the laws and regulations, management system and other "soft" facilities, also includes the construction of laboratory, testing instrument equipped with facilities and other "hard", need to combine, the comprehensive construction.

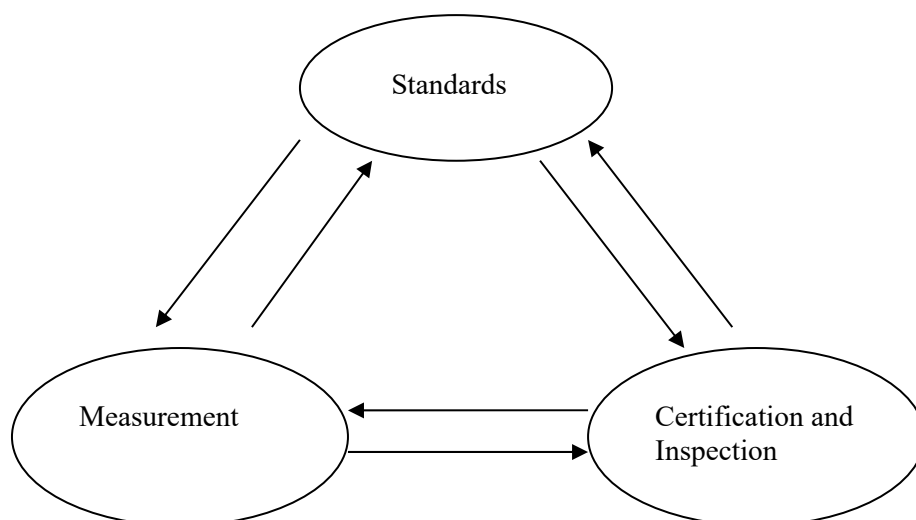


Figure1. National quality technology basic framework [1]

It can be seen from figure 1 that the four elements of national quality technology foundation interact with each other. The standard is the basis of measurement, certification and accreditation and inspection and testing. And conformity assessment (serious recognition, inspection and testing) is an important means to promote the implementation of measurement level and standards. Standards and conformity assessment have given rise to many standardization organizations, such as IAF and ISO, through national governance, the four elements can better support each other and form a virtuous circle.

2. The role is important

Measurement, standards, certification and accreditation, inspection and testing are the four major aspects of the internationally recognized national quality foundation. The national quality foundation is not only the technical support for the government to exert its quality supervision function, but also the core of the national technology trade. The important tool and technical language to promote the cooperation, exchange and trade between China and other countries in the world is of great significance to promoting China from a manufacturing power to a manufacturing power.

2.1. Technical support for the state in exercising its function of quality supervision

China's quality supervision system relies on the technical foundation of measurement, standards, certification and accreditation and inspection and testing, so as to smoothly carry out macro-control and supervision in the market or among enterprises, give play to the macro-management of the government, and ensure the normal operation of the market. Through the responsibilities entrusted by law, the quality supervision department should give play to the quality supervision functions of enterprise products, such as production license, certification and recognition, inspection and testing, market access, supervision and spot check, risk monitoring, law enforcement and counterfeiting, quality recall, etc., so as to ensure national quality safety and development, improve the quality level of the industry and contribute to economic development.

2.2. Establish the government quality technology service enterprise platform

By improving the technical basis of measurement, standards, certification and accreditation, and inspection and testing, the government provides enterprises with services such as measurement and testing, and solves technical problems of products, improves product quality and improves market acceptance of products, providing a good platform support and backing force. The government guides enterprises to learn and update quality knowledge through the service platform, and actively adopts new technologies to improve production level. The government can also encourage leading enterprises to participate in the formulation or revision of important technical standards higher than the national industrial standards through the quality and safety assurance system and standardized policies and regulations, so as to drive the progress of the industry with the development of enterprises, break through the technical barriers of trade and promote the development of trade.

2.3. Important Bridges of the state in foreign trade

The state shall improve the quality level of the state through the quality technology foundation, better integrate with international standards, and participate in international quality technology work, such as perfecting the unification of measurement units and measurement testing, and unification with international general standards. The compilation and formulation of various national standards and the organic unification of foreign standards actively participate in the preparation and revision of standards, and the international certification and recognition of inspection and testing institutions, so that the products of domestic enterprises can reach the international level more simply and directly, and save the cost of the difference of intermediate product standards.

According to statistics, which can be seen in figure 2, 53% of the non-food products recalled by eu in 2016 were from China (including Hong Kong) [2]. The quality improvement of Chinese products and the formulation of product standards in line with international standards are imminent. In addition,

the international integration of quality and technology means that the cost for domestic enterprises to participate in foreign trade is reduced, the channels for enterprises to obtain international standards are more convenient, and the products can better meet the requirements of international trade, reduce trade barriers and speed up the development of foreign trade.

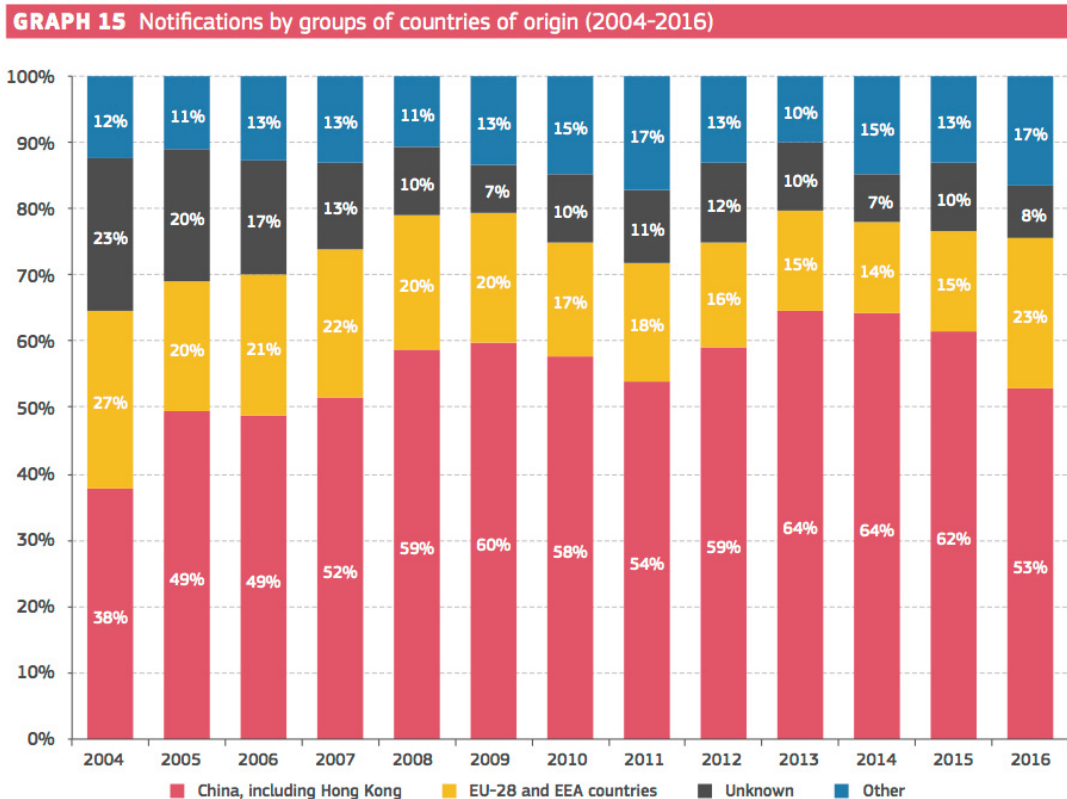


Figure 2. The percentage of products recalled in each country (2004-2016) [2]

3. The characteristics of technological infrastructure in developed countries

Nowadays, developed countries attach great importance to the construction of national quality technology, especially the construction of quality technology foundation. Developed countries have started to develop quality technology far earlier than China, and their development is more comprehensive. Although different countries have different national conditions, they all share the following four characteristics.

3.1. To give prominence to the national strategic position of quality and technological basis

Most developed countries in the world, such as the United States, the United Kingdom and Germany, have explicitly written the measurement into the constitution as the basic requirement for the unified management of the country, highlighting the country's emphasis on quality infrastructure and the strategic position of quality technology foundation in national construction. In 1987, the United States promulgated the quality promotion act, which incorporated quality standards and measurement into the national unified strategy. Japan first took the lead in formulating the comprehensive strategy of Japanese national standards. In 2012, it further formulated the basic science plan of Japan, emphasizing the important role and mutual connection of all elements of the quality and technology foundation. In 2014, Germany issued the new high technology strategy -- innovation Germany, which clearly took the quality technology base as an important pillar of economic development.

3.2. Actively cooperate and develop with other countries in the world

With the deepening of economic globalization, countries around the world are cooperating more and more closely, and this is also true for the development of quality technology foundation. Cross-regional development and cooperation have become more frequent. Many countries have signed the national metrological basis (standard) quasi-mutual recognition agreement to achieve international mutual recognition of measurement and calibration results, accelerate the cooperation in trade and economy among countries, and adapt to the development of economic globalization. The eu regulations and regulations signed by all the member states of the eu, which are mutually recognized among the member states, make the circulation of goods more convenient and the trade exchanges faster.

Not only is the cooperation between developed countries increasingly close, cooperation of the developed countries and developing countries is becoming more and more frequent, the developed countries to developing countries to provide quality technical foundation of technical assistance and standard requirement, make the products of developing countries better accord with the requirement of domestic standards, greatly accelerate the developing countries and developed countries of trade cooperation, win-win situation.

4. Current situation and existing problems of China's technological infrastructure construction

4.1. China's technological base is relatively weak

Compared with developed countries, China's quality technology foundation is relatively weak, the gap is very obvious.

4.1.1. The country's quality technological base remains low in national contribution. The According to statistics [3], Germany's standard construction contributed 0.9% to GDP, while France and Australia contributed 0.8%. However, the contribution of inspection and testing to GDP in China is only 0.1%, and the contribution of certification and recognition to national economic and social development is only 0.914% and 0.338% respectively, which is far lower than that of developed countries.

4.1.2. China's quality and technological base development has low social awareness and low social popularity. Some local governments fail to realize the importance of the quality and technology foundation, pay insufficient attention to the construction of the quality and technology foundation, and lack the initiative to participate in the construction of the quality and technology foundation, so that the development is slow and the effect is not obvious. In addition, many enterprises generally have a low understanding of the quality technology base, and many factories and enterprises cannot make good use of their help to their own enterprise development, making their products poor in quality, low in price and unable to well adapt to the needs of society.

4.2. China's quality and technological base has been significantly strengthened

Although China's quality and technology infrastructure construction started late and its development is still far from perfect, great progress has been made and infrastructure construction has been significantly strengthened through our efforts.

4.2.1. Measurement basis. China has basically set up a national metrological benchmark system covering 10 major disciplines such as geometry, mechanics, electricity, optics, time-frequency and thermal engineering.

4.2.2. Standardization. National, industrial and local standards have been gradually improved, reaching a total of more than 100,000, covering all areas of society and establishing a basic and comprehensive standardization system.

4.2.3. China's certification and accreditation efforts have been greatly strengthened, and the inspection and testing service industry has been continuously improved. The general administration of quality supervision, inspection and quarantine held a press conference on July 14, 2017 to release the statistics of the national certification and accreditation testing service in 2016. This is the first time that the accreditation and inspection and testing are included in the national statistical system after public announcement. By the end of 2016 [4], the national certification and accreditation examination institutions a total of 33622, compared with last year increased by 7.02%, the effective certificate issued by the certification body a total of 1.709 million, a 21.61% increase in value, quantity for testing organizations in 33235, the annual business income is 206.511 billion RMB, achieved a 14.73% growth in 2015, a total inspection test report issued by 356 million. In addition, China has joined 21 certification and accreditation international organizations and signed 13 multilateral mutual recognition agreements and 115 bilateral cooperation mutual recognition agreements. China's certification and accreditation and inspection and testing level is gradually integrating with the international level.

5. How to strengthen technological infrastructure

At present, China has become a world-recognized manufacturing power, and Chinese manufacturing has been well known all over the world. However, China is still far from being a strong manufacturing country. There are many problems in the products manufactured in China, such as low quality, low added value and few independent brands. This requires us to systematically improve our quality and technology level, strengthen quality and technology construction, and improve our product quality and industrial status. Among them, need to grasp from the foundation especially, strengthen the construction work of four elements of quality technology foundation.

5.1. Strengthen the supporting role of metrological foundation

We will strengthen and improve the national metrological system, closely integrate with the new type of industrialization, and establish and improve a metrological benchmark system with high accuracy, stability and international consistency. We will build a number of national benchmark units and standards for metrology, focus on building a new national modern industrial system, build precision measurement infrastructure, a national metrological testing center and metrological laboratory, and focus on building state-level and provincial-level measurement technology testing institutions, and establish a national metrological data monitoring and sharing service platform. In addition, we will actively encourage large and medium-sized enterprises to establish and improve measurement testing and management systems, actively adopt advanced measurement testing technologies and equipment, strengthen the management and application of measurement data, and promote technological innovation and product upgrading of enterprises.

5.2. Strengthening standardization work

Integrate and improve national standards, actively adopt the testing methods and requirements of national standards, and make them more in line with international standards; Implement standard classification management, integration of mandatory standard management, improve the system of voluntary standards, to carry out the pilot group standards, improve the level of key areas of product standards, encourage enterprises to formulate strict in national standard and industry standard enterprise standard, encourage enterprises to actively participate in the development of local standards, industry standards and other modification work, increase and the understanding of the cutting-edge technology of industry of the enterprise. We will build a national unified standard information network and service platform to promote standardized service industries. Actively participate in the formulation and revision of international standards, strive for the initiative in the formulation of international standards, promote China's superior technical standards to become international standards, lead the direction of international standards, and improve China's ability to compete in global technical standards.

6. Outlook

Current our country is in the crucial stage of development of transformation, must adhere to the quality and efficiency as the center, closely around country "much starker choices-and graver consequences-in planning," made in China in 2025, pays special attention to the quality and technical infrastructure work, improve product quality and international competitiveness in all walks of life in our country, really realize the quality of power, to build China into a world industrial power.

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